

Scorpion has welcome sting for heart bypass patients

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A toxin found in the venom of the Central American bark scorpion (*Centruroides margaritatus*) could hold the key to reducing heart bypass failures, according to research from the University of Leeds.

The study, published online in [Cardiovascular Research](#), reports that one of the scorpion's toxins, margatoxin, is at least 100 times more potent at preventing neointimal hyperplasia – the most common cause of bypass graft failure - than any other known compound.

Neointimal hyperplasia is the blood vessel's response to injury. It triggers the growth of new cells, causing chronic obstruction on the inside of the vessel.

When a vein is grafted onto the heart during a bypass procedure, the injury response kicks in as the vein tries to adapt to the new environment and different circulatory pressures. Whilst the growth of new cells helps to strengthen the vein, the internal cell growth restricts blood flow and ultimately causes the graft to fail.

The potency of the margatoxin in suppressing the injury response mechanism took the team by surprise, says lead author Professor Beech from the University's Faculty of Biological Sciences. "It's staggeringly potent. We're talking about needing very few molecules in order to obtain an effect."

The [toxin](#) works by inhibiting the activity of a specific potassium ion

channel - a pore in the cell membrane that opens and closes in response to electrical signals and indirectly enhances delivery of a intracellular messenger, the calcium ion.

"We knew from experimental research in immunology that the ion channel Kv1.3 is involved in activating immune system responses and that it's linked with chronic inflammation problems in the immune system, such as those you see with multiple sclerosis," says Professor Beech. "Since our own studies had identified Kv1.3's presence in injured blood vessels, which are also often complicated by chronic inflammation, we wanted to see if the same [immune system](#) blockers would inhibit neointimal hyperplasia."

"There were a number of good blockers of this ion channel available to screen. Several compounds are developed from plants, and one comes from [scorpion venom](#)," he says, "but margatoxin was the most potent of all these compounds by a significant margin."

Professor Beech says margatoxin would probably be unsuitable as a drug that could be swallowed, inhaled or injected, but it could potentially be taken forward as a spray-on treatment to the vein itself once it's been removed and is waiting to be grafted onto the heart.

Provided by University of Leeds

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